

# Excel for Statistics

**Excel for Statistics** is a series of textbooks that explain how to use Excel to solve statistics problems in various fields of study. Professors, students, and practitioners will find these books teach how to make Excel work best in their respective field. Applications include any discipline that uses data and can benefit from the power and simplicity of Excel. Books cover all the steps for running statistical analyses in Excel 2013, Excel 2010 and Excel 2007. The approach also teaches critical statistics skills, making the books particularly applicable for statistics courses taught outside of mathematics or statistics departments.

**Series editor:** Thomas J. Quirk

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Thomas J. Quirk • Meghan H. Quirk  
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# Excel 2010 for Environmental Sciences Statistics

A Guide to Solving Practical Problems

 Springer

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*This book is dedicated to the more than 3000 students I have taught at Webster University's campuses in St. Louis, London, and Vienna; the students at Principia College in Elsau, Illinois; and the students at the Cooperative State University of Baden-Wuerttemberg in Heidenheim, Germany. These students taught me a great deal about the art of teaching. I salute them all and I thank them for helping me to become a better teacher.*

*Thomas J. Quirk*

*We dedicate this book to all the newly inspired students emerging into the ranks of the various fields of science.*

*Meghan H. Quirk and Howard F. Horton*



# Preface

*Excel 2010 for Environmental Sciences Statistics: A Guide to Solving Practical Problems* is intended for anyone looking to learn the basics of applying Excel's powerful statistical tools to their science courses or work activities. If understanding statistics isn't your strongest suit, you are not especially mathematically inclined, or if you are wary of computers, then this is the right book for you.

Here you'll learn how to use key statistical tests using Excel without being overpowered by the underlying statistical theory. This book clearly and methodically shows and explains how to create and use these statistical tests to solve practical problems in the environmental sciences.

Excel is an easily available computer program for students, instructors, and managers. It is also an effective teaching and learning tool for quantitative analyses in science courses. The powerful numerical computational ability and the graphical functions available in Excel make learning statistics much easier than in years past. However, this is the first book to show Excel's capabilities to more effectively teach environmental sciences statistics; it also focuses exclusively on this topic in an effort to render the subject matter not only applicable and practical but also easy to comprehend and apply.

Unique features of this book:

- This book is appropriate for use in any course in the Environmental Sciences Statistics (at both undergraduate and graduate levels) as well as for managers who want to improve the usefulness of their Excel skills.
- This includes 163 color screen shots so that you can be sure you are performing the Excel steps correctly.
- You will be told each step of the way not only *how* to use Excel but also *why* you are doing each step so that you can understand what you are doing, and not merely learn how to use statistical tests by rote.
- This includes specific objectives embedded in the text for each concept, so you will know the purpose of the Excel steps.

- This book is a tool that can be used either by itself or along with *any* good statistics book.
- Statistical theory and formulas are explained in clear language without bogging you down in mathematical fine points.
- You will learn both how to write statistical formulas using Excel and how to use Excel's drop-down menus that will create the formulas for you.
- This book does not come with a CD of Excel files which you can upload to your computer. Instead, you'll be shown how to create each Excel file yourself. In a work situation, your colleagues will not give you an Excel file; you will be expected to create your own. This book will give you ample practice in developing this important skill.
- Each chapter presents the steps needed to solve a practical environmental science problem using Excel. In addition, there are three practice problems at the end of each chapter so you can test your new knowledge of statistics. The answers to these problems appear in Appendix A.
- A "Practice Test" is given in Appendix B to test your knowledge at the end of the book. The answers to these practical science problems appear in Appendix C.

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*Excel 2010 for Environmental Sciences Statistics: A Guide to Solving Practical Problems* is the result of inspiration from three important people: my two daughters and my wife. Jennifer Quirk McLaughlin invited me to visit her M.B.A. classes several times at the University of Witwatersrand in Johannesburg, South Africa. These visits to a first-rate M.B.A. program convinced me there was a need for a book to teach students how to solve practical problems using Excel. Meghan Quirk-Horton's dogged dedication to learning the many statistical techniques needed to complete her Ph.D. dissertation illustrated the need for a statistics book that would make this daunting task more user-friendly. And Lynne Buckley-Quirk was the number one cheerleader for this project from the beginning, always encouraging me and helping me remain dedicated to completing it.

Thomas Quirk

We would like to acknowledge the patience of our two little girls, Lila and Elia, as we worked on this book with their TQ. We would also like to thank Professors Sarah Perkins, Doug Warren, John Moore, and Lee Dyer for their guidance and support during our college and graduate school careers.

Meghan Quirk and Howard Horton

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